Boeing Commercial Airplane Group

Contact: David.Reed2@PSS.Boeing.com

Optimization of Engine Aft Fan Duct Acoustic Linings

The CDUCT code developed by Boeing under NASA AST contract models the acoustics of realistic three-dimensional engine fan ducts by means of parabolic approximation to the convected Helmholtz equation. With this approximation, the important frequency range can be modeled, accounting for flow, geometry, and acoustic lining effects using only an engineering workstation. Figure 1 illustrates the propagation of a mode through a typical fan duct with inner and outer walls treated. The direction of wave propagation is angled toward the upper bifurcation. Design studies are underway, seeking superior acoustic performance via optimization of the axial distribution of lining properties.

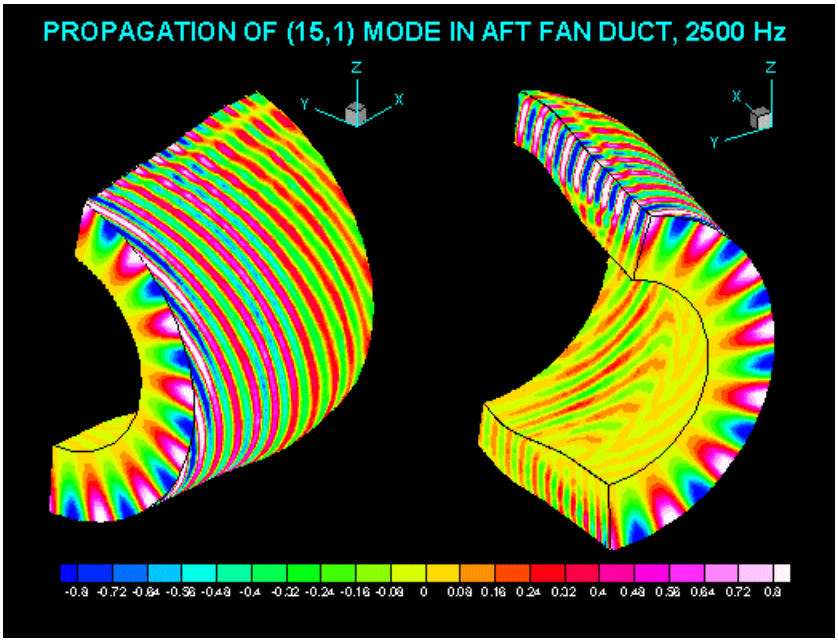

Figure 1 - Noise Propagation in Three Dimensional Aft Fan Duct